Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1.- 8. (canceled)

9. (currently amended) A isolated double ~~protein~~ mutant RecA protein comprising a ~~deletion~~ truncation of at least 13 - 25 amino ~~acids~~ acid residues from the carboxyl terminus and ~~the~~ an amino acid change from a glutamate to a basic amino acid at position 38.

10. (currently amended) The protein of Claim 9 wherein the truncation is 17 amino ~~acids~~ acid residues ~~are deleted truncated~~ from the carboxyl terminus.

11. (currently amended) The protein of Claim 9 wherein the basic amino acid is ~~to~~ lysine.

12. (currently amended) The protein of Claim 9 wherein the basic amino acid is ~~to~~ arginine.

13. (currently amended) The protein of Claim 9 wherein 17 amino acid ~~acids~~ residues are ~~deleted~~ truncated from the carboxyl terminus and the glutamate is changed to lysine, as set forth in SEQ ID NO. 3.

14. (withdrawn) A polynucleotide sequence, as set forth in SEQ ID NO. 4, encoding the protein of Claim 13.

15. (original) The protein of Claim 13 comprising an enhanced capacity to displace a DNA binding protein as compared to wild-type RecA.

16. (currently amended) The protein of Claim 15 wherein the ~~DNA binding~~ protein is a single stranded DNA binding protein, SSB.

17. (original) The protein of Claim 13 comprising an increased steady-state DNA binding capacity during a DNA strand exchange reaction as compared to wild-type RecA.

18. (original) The protein of Claim 17 wherein the DNA is single-stranded.

19. (original) The protein of Claim 17 wherein the DNA is double-stranded.

20. (original) The protein of Claim 19 wherein the double-stranded DNA is linear or circular.

21. (original) The protein of Claim 17 wherein the DNA strand exchange reaction is pH dependent.

22. (currently amended) The protein of Claim 21 wherein the DNA strand exchange reaction induces complete product formation ~~at~~ between a pH ~~between~~ of 8.0 to 9.0 ~~7.5 – 9.5~~.

23. (currently amended) The protein of Claim 21 wherein the DNA strand exchange reaction induces complete product formation at a pH of 8.5 ~~(± 1.0)~~.

24. (original) The protein of Claim 17 wherein the DNA strand exchange reaction is Mg2+ concentration dependent.

25. (original) The protein of Claim 24 wherein the Mg2+ concentration is between 4mM – 8mM.

26. (original) The protein of Claim 24 wherein the Mg2+ concentration is 5mM.

27. (original) The protein of Claim 13 wherein the protein promotes an extended reaction, wherein the extended reaction is at least a three-strand exchange reaction.

28. (canceled)

29. (withdrawn) A method of catalyzing in vitro homologous DNA pairing and DNA strand exchange reactions comprising providing a sufficient amount of the protein of Claim 1.

30. (withdrawn) A method of catalyzing in vitro homologous DNA pairing and DNA strand exchange reactions comprising providing a sufficient amount of the protein of Claim 9.

31. (withdrawn) A method of increasing recombination efficiency of homologous DNA pairing and DNA strand exchange reactions in a cell comprising supplying to the cell a sufficient amount of the protein of Claim 1.

32. (withdrawn) A method of increasing recombination efficiency of homologous DNA pairing and DNA strand exchange reactions in a cell comprising supplying to the cell a sufficient amount of the protein of Claim 9.

33.-34. (canceled)

35. (original) A kit comprising the protein of Claim 9.

36. (original) A kit comprising the protein of Claim 13.

37. (new) An isolated double mutant RecA protein comprising a truncation of up to 17 amino acid residues from the carboxyl terminus and an amino acid change from a glutamate to a basic amino acid at position 38.

38. (new) A kit comprising the protein of Claim 37.

39. (new) An isolated double mutant RecA protein comprising a truncation of 17 amino acid residues from the carboxyl terminus and an amino acid change from a glutamate to a basic amino acid at position 38, wherein the basic amino acid is lysine, as set forth in SEQ ID NO: 3.

40. (new) A kit comprising the protein of Claim 39.

41. (new) An isolated double mutant RecA protein comprising a truncation of at least 13 - 25 amino acid residues from the carboxyl terminus and an amino acid change from a glutamate to a basic amino acid at position 38, wherein the basic amino acid is lysine.

42. (new) An kit comprising the protein of Claim 41.

43. (new) An isolated double mutant RecA protein comprising a truncation of at least 13 – 20 amino acid residues from the carboxyl terminus and an amino acid change from a glutamate to a basic amino acid at position 38.

44. (new) An isolated double mutant RecA protein comprising a truncation of at least 13 – 17 amino acid residues from the carboxyl terminus and an amino acid change from a glutamate to a basic amino acid at position 38.